



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

04

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,760	10/30/2003	Minhua Lu	YOR920030499US1 (17075)	8778
23389 7590 06/01/2007 SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			EXAMINER NGO, HUYEN LE	
			ART UNIT 2871	PAPER NUMBER
			MAIL DATE 06/01/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/697,760	LU ET AL.	
	Examiner	Art Unit	
	Julie-Huyen L. Ngo	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/29/06 & 10/17/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/17/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1 and 18 based on the Response filed on September 29, 2006 considered but are moot in view of the new ground(s) of rejection. Therefore, this is Final action.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4,5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US 5438421) in view of Yutaka (JP55-166626).

With respect to claims 1 and 18, Saguawara discloses a liquid crystal display (LCD) device comprising:

- a first substrate having a grooved surface profile; an alignment film layer of inorganic or organic material formed on said grooved surface and having said grooved surface profile, said alignment film of inorganic or organic material having 90° meta-stable alignment states eliminated at the surface of said alignment film layer and having an increased alignment force for constraining deposited LC material to a direction parallel to the grooves;

Art Unit: 2871

- a second substrate aligned opposite said first substrate for forming a plurality of LCD cells having said liquid crystal (LC) material deposited therein,

As to the limitation of "*an increased alignment force for constraining or enhancing deposited LC material to a direction parallel to the grooves*" is deemed to be inherent intended use (see last final office action: page 7 at second paragraph). Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of anticipation has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

wherein

Claim 2:

- the material of the underlayer comprises an organic resin material (col. 11, lines 50-51)

Claim 4:

- the second aligned substrate (fig. 21, ref. 41) opposite the first substrate includes a top alignment layer (fig. 21, ref. 45) having a flat surface profile

Claim 5:

- the second aligned substrate (fig. 10, ref. 41) opposite the first substrate includes a top alignment layer (fig. 10, ref. 48) having a grooved surface profile.

However, Sugawara fails to disclose forming said alignment film of inorganic or organic material having 90° meta-stable alignment states eliminated at the surface of

Art Unit: 2871

said alignment film layer for obtaining the vertical alignment of superior heat resistance and moisture resistance (abstract).

Yutaka teaches (abstract) forming said alignment film of inorganic or organic material having a stable vertical alignment, thus 90° meta-stable alignment states eliminated at the surface of said alignment film layer for obtaining the vertical alignment of superior heat resistance and moisture resistance.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a liquid crystal display device as Sugawara disclosed with an alignment film of inorganic or organic material having a stable vertical alignment, thus 90° meta-stable alignment states eliminated at the surface of said alignment film layer for obtaining the vertical alignment of superior heat resistance and moisture resistance, as taught by Yutaka.

Claims 1, 2, 4-5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US 5438421) in view of Ryujiro (JP56-138716).

With respect to claims 1 and 18, Saguawara discloses a liquid crystal display (LCD) device comprising:

- a first substrate having a grooved surface profile; an alignment film layer of inorganic or organic material formed on said grooved surface and having said grooved surface profile, said alignment film of inorganic or organic material having 90° meta-stable alignment states eliminated at the surface of said alignment film layer and having an increased alignment force for constraining deposited LC material to a direction parallel to the grooves;

Art Unit: 2871

- a second substrate aligned opposite said first substrate for forming a plurality of LCD cells having said liquid crystal (LC) material deposited therein,

As to the limitation of "*an increased alignment force for constraining or enhancing deposited LC material to a direction parallel to the grooves*" is deemed to be inherent.

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of anticipation has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

Wherein

Claim 2:

- the material of the underlayer comprises an organic resin material (col. 11, lines 50-51)

Claim 4:

- the second aligned substrate (fig. 21, ref. 41) opposite the first substrate includes a top alignment layer (fig. 21, ref. 45) having a flat surface profile

Claim 5:

- the second aligned substrate (fig. 10, ref. 41) opposite the first substrate includes a top alignment layer (fig. 10, ref. 48) having a grooved surface profile.

However, Sugawara fails to disclose forming said alignment film of inorganic or organic material having 90° meta-stable alignment states eliminated at the surface of said alignment film layer.

Ryujiro teaches forming said alignment film of inorganic or organic material having a stable vertical alignment, thus 90° meta-stable alignment states eliminated at the surface of said alignment film layer for obtaining high visual recognizability.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a liquid crystal display device as Sugawara disclosed with forming said alignment film of inorganic or organic material having a stable vertical alignment, thus 90° meta-stable alignment states eliminated at the surface of said alignment film layer for obtaining high visual recognizability (in constitution), as taught by Ryujiro.

Claims 6-7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US 5438421) in view of Yutaka (JP55-166626) applied above to claim 1, and in further view of Bryan-Brown et al. (U.S. Patent No. 5,917,570).

Sugawara also disclose a groove being not continuous along a lengthwise direction (claim 10), the grooves terminated in a length direction and restart in a slightly difference location with different height and widths (claim 11).

Sugawara fails to specifically disclose:

(a) a surface anchoring energy that increases when compared to LC materials deposited between fiat substrate surfaces and aligning LC materials parallel to the grooves enables decreased potential energy (**claims 6-7**);

(b) a grooved surface profile of the alignment film being sinusoidal (**claim 9**).

Bryan-Brown teaches (fig. 5a, 5b; col. 5, lines 4-15) an LCD) forming a device where the LC molecules having a surface anchoring energy that increases when compared to LC materials deposited between flat substrate surfaces and aligning LC materials parallel to the grooves for decreasing potential energy.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a liquid crystal display device as Sugawara disclosed to have (a) a surface anchoring energy that increases when compared to LC materials deposited between flat substrate surfaces and aligning LC materials parallel to the grooves for decreasing potential energy and (b) a grooved surface profile of the alignment film being sinusoidal since one would be motivated to provide a pretilted alignment that is essential in avoiding reverse tilt disclinations, which can lead to poor device quality (col. 1, lines 59-62). Doing so would enhance LCD performance, as taught by Bryan-Brown.

Claims 6, 7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US 5438421) in view of Ryujiro (JP56-138716) as applied above to claim 1, and further in view of Bryan-Brown et al. (U.S. Patent No. 5,917,570).

With respect to claim 10, Sugawara discloses a groove being not continuous along a lengthwise direction.

With respect to claim 11, Sugawara discloses that the grooves terminate in a length direction and restart in a slightly different location with different height and widths.

Sugawara fails to specifically disclose (a) a surface anchoring energy that increases when compared to LC materials deposited between fiat substrate surfaces and aligning LC materials parallel to the grooves enables decreased potential energy (**claims 6-7**); (b) a grooved surface profile of the alignment film being sinusoidal (**claim 9**).

Bryan-Brown teaches (fig. 5a, 5b; col. 5, lines 4-15) forming an LCD device where the LC molecules having:

Claims 6 and 7:

- a surface anchoring energy that increases when compared to LC materials deposited between flat substrate surfaces and aligning LC materials parallel to the grooves enables decreased potential energy

Claim 9:

- a grooved surface profile of the alignment film being sinusoidal

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a liquid crystal display device as Sugawara disclosed to have (a) a surface anchoring energy that increases when compared to LC materials deposited between flat substrate surfaces and aligning LC materials parallel to the grooves enables decreased potential energy and (b) a grooved surface profile of the alignment film being sinusoidal since one would be motivated to provide pretilted alignment that is essential in avoiding reverse tilt disclinations which can lead to poor device quality (col. 1, lines 59-62), thus providing enhanced LCD performance, as taught by Bryan-Brown.

Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US 5438421) in view of Yutaka (JP55-166626) as applied above to claim 1, and further in view of Callegari et al (US6020946).

Sugawara fails to specifically disclose an alignment film of inorganic material being a diamond-like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, Sic, SiO₂, Al₂O₃, CeO₂, SnO₂, and ZnTiO₂.

Callegari teaches (col. 3, lines 1-24) forming an alignment film of inorganic material being a diamond-like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, Sic, SiO₂, Al₂O₃, CeO₂, SnO₂, and ZnTiO₂.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a liquid crystal display device as Sugawara disclosed with an alignment film of inorganic material being a diamond like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, Sic, SiO₂, Al₂O₃, CeO₂, SnO₂, and ZnTiO₂ for providing an optically transparent and amorphous or fine-grained material, which are comparable to polyimide films but require fewer steps and are less costly to manufacture (col. 3, lines 8-15). Ultimately, this serves to provide greater design flexibility in LCD devices without sacrificing its optical characteristics, as taught by Callegari.

Claim 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US 5438421) in view of Ryujiro (JP56-138716) as applied above to claim 1, and further in view of Callegari et al (US6020946).

Sugawara fails to specifically disclose an alignment film of inorganic material being a diamond-like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, Sic, 302, Al₂O₃, CeO₂, SnO₂, and ZnTiO₂.

Callegari teaches (col. 3, lines 1-24) forming an alignment film of inorganic material being a diamond-like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, Sic, SiO₂, Al₂O₃, CeO₂, SnO₂, and ZnTiO₂ for providing an optically transparent and amorphous or fine-grained material, which are comparable to polyimide films but require fewer steps and are less costly to manufacture.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a liquid crystal display device as Sugawara disclosed to have an alignment film of inorganic material being a diamond like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, Sic, SiO₂, Al₂O₃, CeO₂, SnO₂, and ZnTiO₂ for providing an optically transparent and amorphous or fine-grained material, which are comparable to polyimide films but require fewer steps and are less costly to manufacture. Ultimately, this serves to provide greater design flexibility in LCD devices without sacrificing its optical characteristics (col. 3, lines 16-24).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie-Huyen L. Ngo whose telephone number is (571) 272-2295. The examiner can normally be reached on M-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2871

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'Julie-Huyen L. Ngo', with a stylized, flowing script.

Julie-Huyen L. Ngo
Primary Examiner
Art Unit 2871